VOL. LVI, NO. 12, DECEMBER, 1961

THE Journal OF THE AMERICAN LEATHER CHEMISTS ASSOCIATION

PUBLISHED MONTHLY BY
THE AMERICAN LEATHER CHEMISTS ASSOCIATION
PUBLICATION OFFICE, EASTON, PA.

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The Journal

of the

AMERICAN LEATHER CHEMISTS ASSOCIATION

Vol. LVI DECEMBER 1961 No. 12

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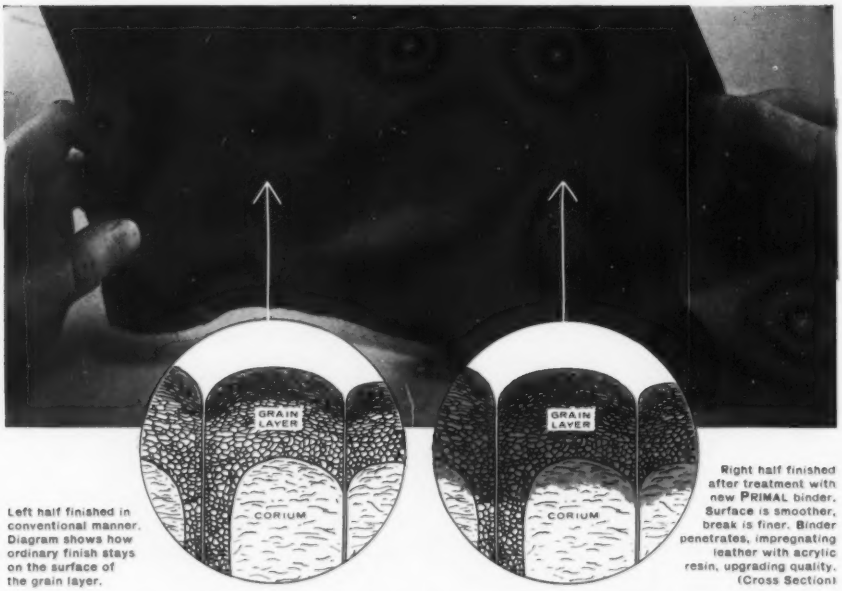

Left half finished in conventional manner. Diagram shows how ordinary finish stays on the surface of the grain layer.

Right half finished after treatment with new PRIMAL binder. Surface is smoother, break is finer. Binder penetrates, impregnating leather with acrylic resin, upgrading quality. (Cross Section)

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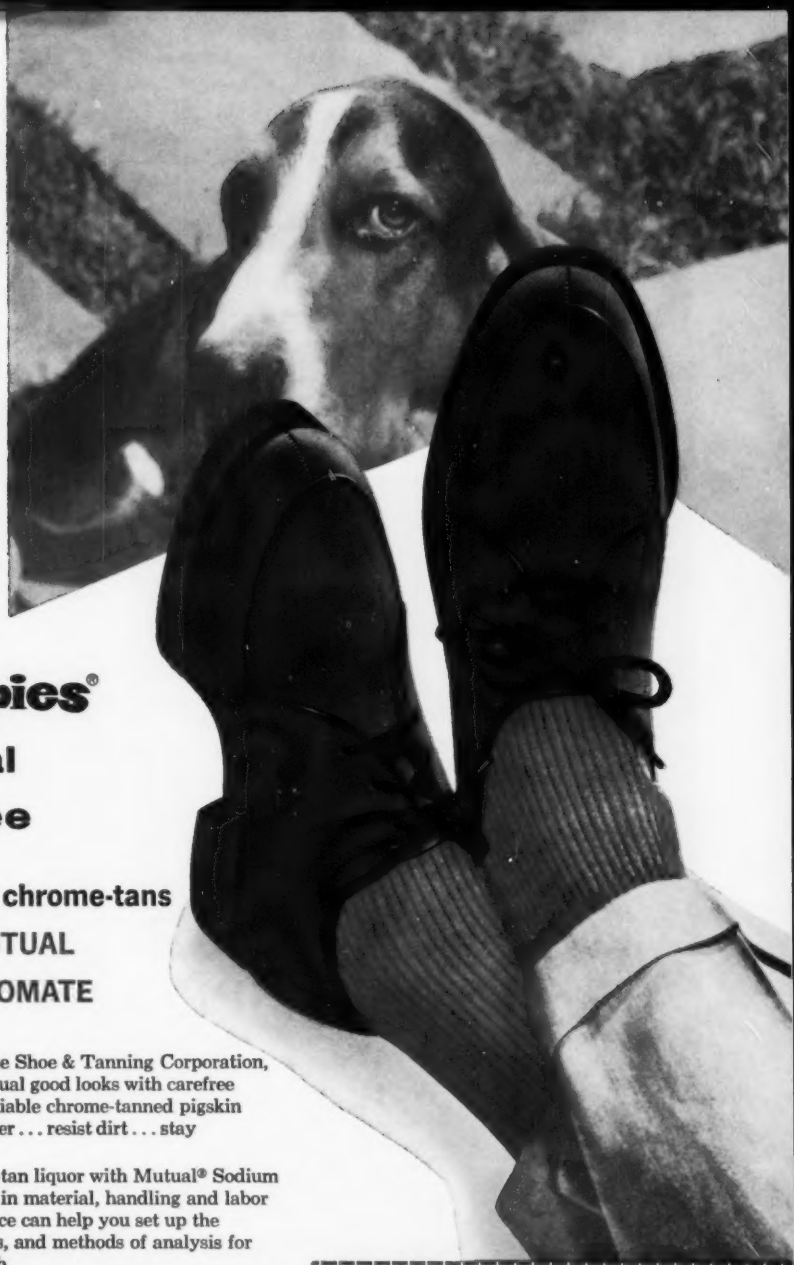

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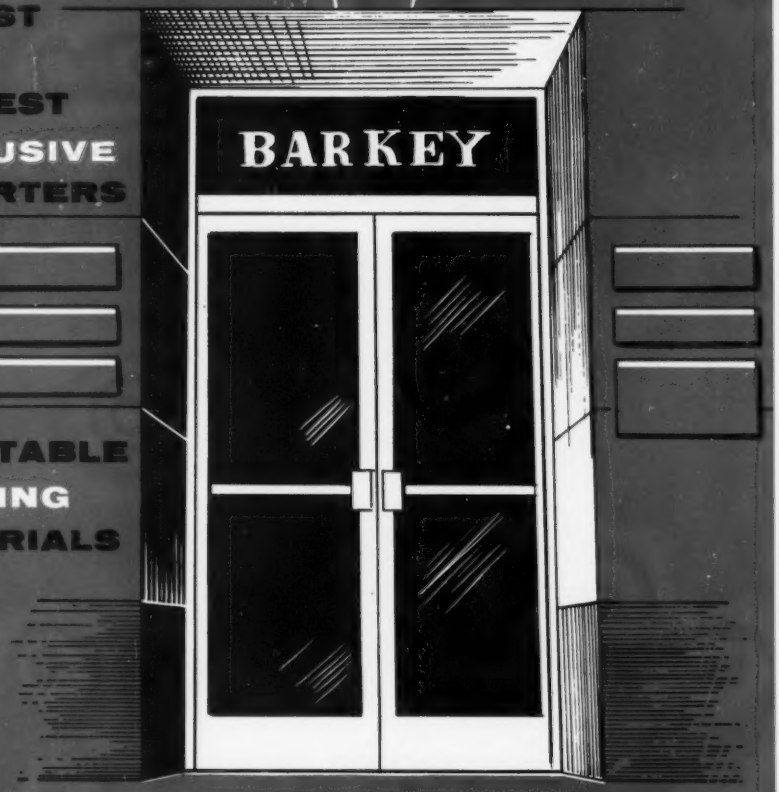

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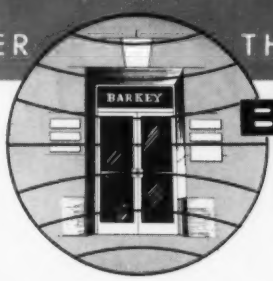

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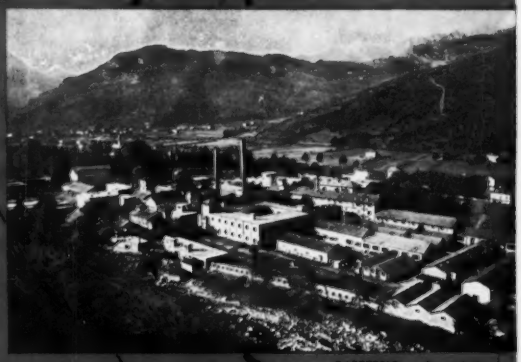

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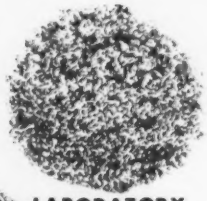

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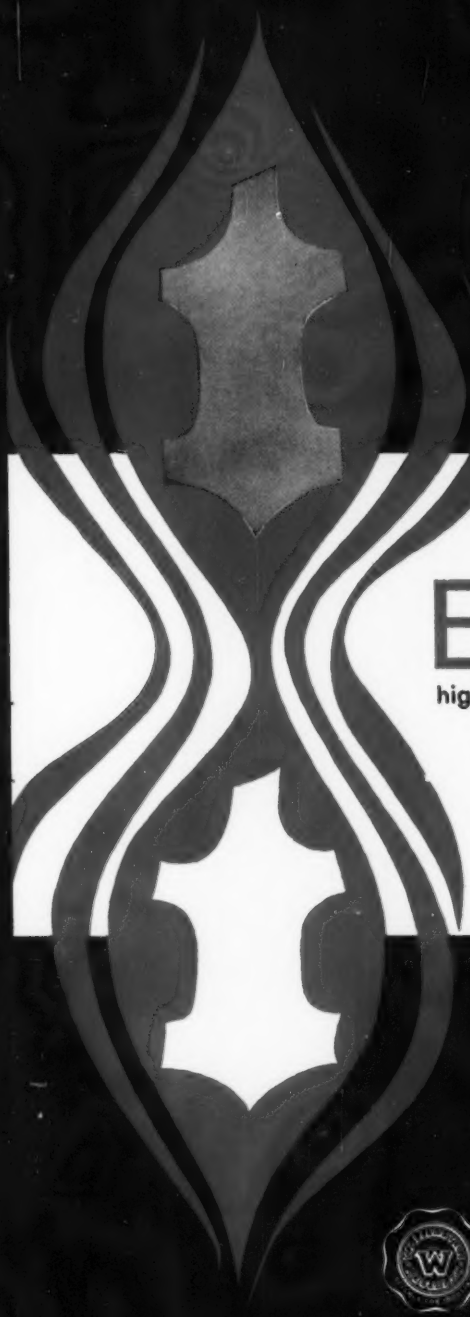

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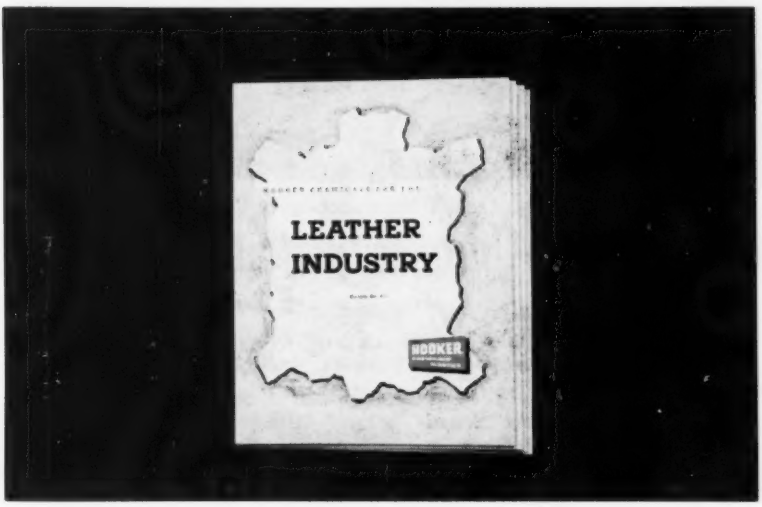

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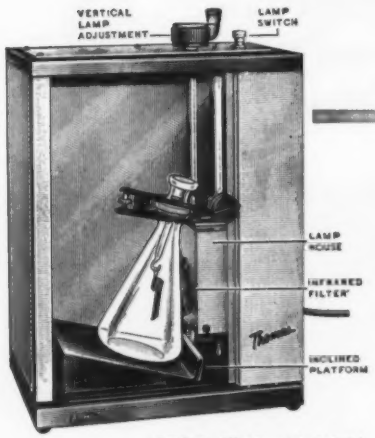

6472-B. *(Flask not included.)*

- *Utilizes focused infrared beam for ignition*
- *Flask shielded completely during ignition and combustion*
- *Takes flasks 500 to 2000 ml capacity*

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5,6-DICHLORO-2-BENZOXAZOLINONE AS A LEATHER FUNGICIDE*

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ABSTRACT

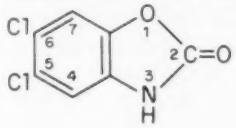
5,6-Dichloro-2-benzoxazolinone, a nonphenolic compound, has been investigated as a leather fungicide. Very mildew-susceptible leather, such as vegetable-tanned sole leather, is adequately mildew-proofed by about 0.4%. A smaller percentage is adequate for other types of leather. The fungicide is stable, colorless, nonvolatile, and relatively resistant to removal by leaching with water. It is a much more effective leather fungicide than 2-benzoxazolinone, which indicates that the chlorine substituents are important. Because of the known general fungitoxic activity of phenols, it might be postulated that rupture of the oxazolinone ring with production of 2-amino-4,5-dichlorophenol occurs and that the latter compound constitutes the fungitoxic substance. However, this does not seem to occur in leather, as 5,6-dichloro-2-benzoxazolinone is very stable under acid conditions. Furthermore, 2-amino-4,5-dichlorophenol showed no fungitoxic activity when tested in leather.

INTRODUCTION

Previous reports have discussed the use of various fungitoxic substances for the prevention of mildew growth on leather (1–4). The present

*Presented at the Seventh Biennial Conference of the International Union of Leather Chemists Societies in Washington, D. C., August 20-25, 1961. A second paper, "Colorimetric Determination of 5,6-Dichloro-2-benzoxazolinone in Leathers" will be published in the January *Journal*.

report deals with an investigation of 5,6-dichloro-2-benzoxazolinone:



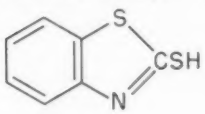
I

5,6-Dichloro-2-benzoxazolinone

Preparation and antifungal properties of this compound have been described in a patent (5), but no other reference to it has been found in the literature. However, there are published reports on the unsubstituted compound, 2-benzoxazolinone, and on derivatives having substituents other than 5,6-dichloro in the benzene ring, both as to preparation and biological activities. 2-Benzoxazolinone and 6-methoxy-2-benzoxazolinone have also been isolated from certain plants where they appear to play a protective role against fungi and insects (6, 7).

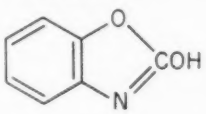
Effects on dormancy of seeds (8), and analeptic (restorative) (9), hypnotic (10), and anthelmintic (intestinal worm-destroying) (11) properties have been attributed to 2-benzoxazolinone or its derivatives. A recent patent describes the preparation and antifungal activity of 2-benzoxazolinone derivatives in which the imino hydrogen is replaced by the $SCCl_3$ group (12). In this patent, and frequently in other literature references, the parent structure is named benzoxazolone. A still shorter name, benzoxalone, sometimes has been used in trade literature (13). In the patent covering compound I (5), it is named as a benzoxazole, i.e., 5,6-dichloro-2,3,-dihydrobenzoxazole-2-one. The nomenclature and numbering system used throughout this report will be as shown in I.

2-Benzoxazolinone derivatives apparently have not been used as fungicides in industrial or agricultural applications. None is listed in compilations of such fungicides (14, 15). 2-Mercaptobenzothiazole, the sulfur analog of 2-hydroxybenzoxazole, is a known fungicide, however (15, 16). 2-Hydroxybenzoxazole is the tautomeric (lactim) form of 2-benzoxazolinone (lactam). These relationships are shown as follows:



II

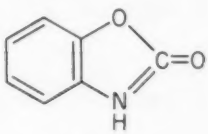
2-Mercaptobenzothiazole



(lactim)

III

2-Hydroxybenzoxazole



(lactam)

IV

2-Benzoxazolinone

It is thought that of the two tautomeric structures III and IV, the lactam form predominates in chemical reactions and in solutions (17).

MATERIALS AND METHODS

In addition to 5,6-dichloro-2-benzoxazolinone several other compounds were tested for fungitoxic properties when present in leather. These were as follows:

(*a*) Benzoxazolinone, i.e., structure IV which differs from I in that it has hydrogen instead of chlorine on ring carbons 5 and 6. Comparison with I should therefore show the effect of chlorine substituents.

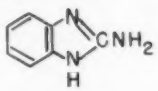
(*b*) The phenols that could be formed from the two benzoxazolinones by hydrolytic rupture of the oxazo ring, i.e., 2-amino-4,5-dichlorophenol and 2-aminophenol. If such rupture occurred in the leather, the mildew-inhibiting effect could be due to the liberated free phenols. Comparison of the two types of compounds should show which, in leather, is the fungitoxic substance. This comparison was of particular interest in view of the findings of Beck and Smissman (7) that the aminophenols in an agar medium were at least as fungitoxic as the corresponding benzazolinones, whereas 2-amino-4-chlorophenol, which had been tested in this laboratory, proved to be a very poor leather fungicide (2).

(*c*) Some compounds that have chemical structures or functional groups in some manner resembling 2-benzoxazolinone were tested in the hope that they might provide information about the relationship between structure and fungitoxicity.

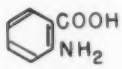
Except for 5,6-dichloro-2-benzoxazolinone and 2-amino-4,5-dichlorophenol, which were donated by Geigy Industrial Chemicals, all the compounds used in this investigation were obtained commercially. Figures 1 and 2 show their names and structures.

COMPOUNDS WITH NO ACTIVITY

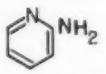
2-AMINOBENZIMIDAZOLE



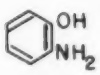
2-AMINOBENZOIC ACID



2-AMINOPYRIDINE



2-AMINOPHENOL



4-AMINOPHENOL

FIGURE 1.—Compounds showing no inhibition of mildew growth on leather at a concentration of 3.8 millimols per 100 grams of original air-dry leather.

Solutions of the compounds in organic solvents were used for deposition of the desired amounts in vegetable-tanned sole crust leather specimens. This was accomplished by immersion of the specimens in the solutions as described previously (4). Each compound was tested at three concentrations which were 3.80, 1.9, and 0.95 millimols per 100 grams of dry leather. The solvent mixture, in all cases, consisted of cyclohexanone, mineral oil, and trichloroethylene in the proportions 30%, 10%, and 60% by weight. The first compound listed in Fig. 1 was not completely soluble at the highest concentration in the solvent mixture. The percent deposition, therefore, in this case was less than that calculated.

After solvent evaporation, the leather specimens were tested for mildew resistance by exposure in the tropical room at the U. S. Army Engineering Center at Fort Belvoir, Va., for five weeks. The details of this test have been described in previous publications (1, 4).

MILDEW INHIBITING PERFORMANCE

The compounds shown in Fig. 1 did not inhibit mildew growth on the leather specimens even at the highest concentration used, i.e., the extent of

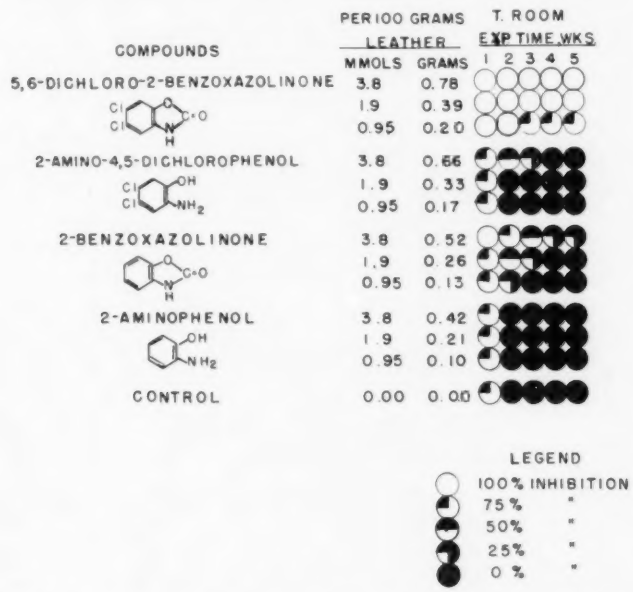


FIGURE 2.—Inhibition of mildew growth by 5,6-dichloro-2-benzoxazolinone, 2-benzoxazolinone, and the two corresponding phenols in leather under tropical room conditions.

the growth was the same as on the control leather specimens. 1-Aminophenol and 4-aminophenol fell in this group, as did the 2-amino-4-chlorophenol tested earlier (2).

Figure 2 shows the test results for the two benzoxazolinones and the two corresponding phenols. Since the rate of appearance of mildew growth as well as the final mildew growth might indicate differences in activity, the results of weekly inspections of the specimens during the exposure in the tropical room are given. Observations were made for seven weeks, although the results for only five weeks are shown. Actually it can be seen that there were no appreciable changes after three weeks. A photograph of the samples after they were removed from the tropical room is shown in Fig. 3. The results indicate that the 2-benzoxazolinone nucleus is essential for activity and that the presence of the two chlorine substituents on this nucleus enhances the activity enormously. Rupture of the oxazo ring with conversion to the aminophenol would, according to these results, cause loss of activity.

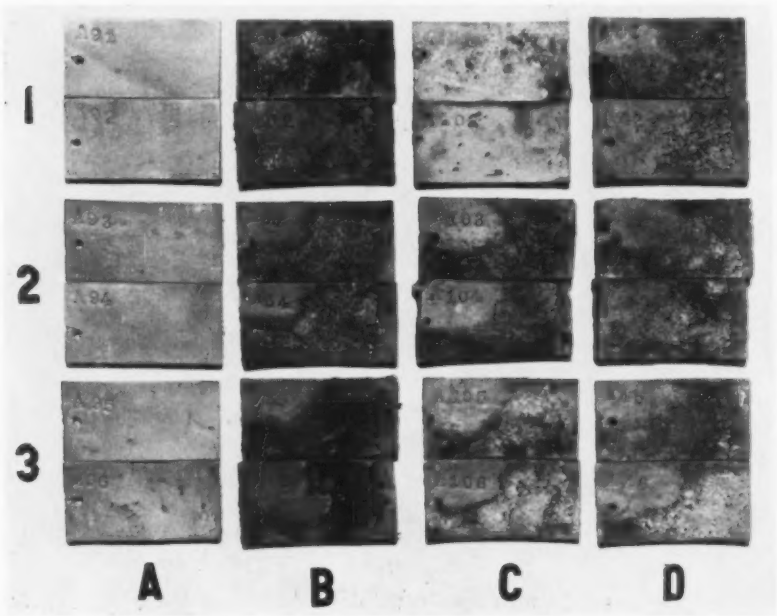


FIGURE 3.—Appearance of the leather samples after storage in the tropical room for 7 weeks. *A*, *B*, *C*, *D* designate 5,6-dichloro-2-benzoxazolinone, 2-amino-4,5-dichlorophenol, 2-benzoxazolinone, and 2-aminophenol, respectively; and 1, 2, 3 indicate highest, intermediary, and lowest fungicide concentration, respectively. (During inspection of the specimens some of the mildew was rubbed off).

From our results, it appears that 5,6-dichloro-2-benzoxazolinone is the only compound among those investigated that is sufficiently fungitoxic to be useful as a leather fungicide.

PERMANENCE OF MILDEWPROOFING TREATMENT

The permanence of a fungicide in leather has been shown to be an important factor in the evaluation of its usefulness (3). To obtain information about this phase of the mildewproofing treatment with 5,6-dichloro-2-benzoxazolinone, the following experiments were performed with two leathers, vegetable-tanned sole crust leather and chrome-tanned military-type black upper leather.

Effect of weathering and heat.—Like sets of 2″ x 4″ leather specimens, treated to contain known concentrations of 5,6-dichloro-2-benzoxazolinone, were exposed in the following manner:

(*a*) *Exposure to sun only.*—The specimens were exposed to natural sunlight on a roof at the National Bureau of Standards, Washington, D. C. Four sets of specimens were used, one set for each of three weathering periods, 30, 60, and 90 days, and one set for control (no weathering). A cover, consisting of a 2-mil-thick film of cellulose acetate butyrate, was used to protect the specimens from rain.

(*b*) *Exposure to sun and rain.*—Four other sets of specimens were exposed in the manner described in (*a*) except that the samples were not covered and were thus exposed to rain as well as sun.

(*c*) *Exposure to oven heat.*—One set of specimens was heated in an oven at 50° C. for seven days.

When the exposures described under (*a*), (*b*), and (*c*) were completed, each individual 2″ x 4″ specimen was cut into two 2″ x 2″ specimens, making two like series of sets. One of these series was tested for mildew resistance by exposure in a tropical room at the U. S. Army Engineering Center, Fort Belvoir, Va. The tropical room exposure test predicts quite correctly the performance of the fungicide under the most severe mildew-growing conditions that may be encountered, i.e., those of a tropical jungle (1). The other set was tested by exposure in the tropical room at the Quartermaster Research and Engineering Command at Natick, Mass. The amounts of mildew growth on the leather specimens were estimated visually each week. After four or five weeks there was essentially no further change in the observed amounts of growth, and the final results obtained in the two tropical rooms were in good agreement. Figure 4 gives the averages of the results of the mildew resistance tests in both tropical rooms.

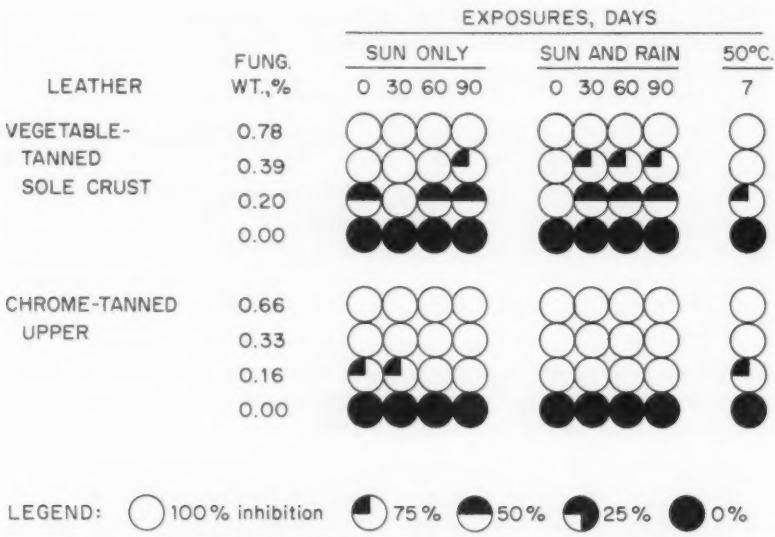


FIGURE 4.—Effect of weathering and heat on the effectiveness of 5,6-dichloro-2-benzoxazolinone as a mildew preventive for leather. Amount of fungicide shown as weight percent increase of treated leather.

It is clear, from Fig. 4, that a concentration of about 0.4% of the fungicide, based on air-dry leather weight, provides mildew protection for the vegetable sole crust leather under all the experimental conditions used. This leather is very susceptible to mildew attack. Approximately half of this concentration, or about 0.2%, is adequate for protection of the chrome-tanned upper leather. There is no indication that the natural weathering or heating at 50°C. decreased the effectiveness of the fungicide.

The residual amounts of the fungicide in the leather specimens were determined by a method described in another paper (18). The results, given in Table I, show that the amounts of fungicide in the leathers exposed in the various ways were about the same. In all cases the amounts found were slightly less than those calculated from absorption and concentration of the impregnating solutions. The reason for this may be that some of the fungicide may have been lost by abrasion during the grinding of the leather in a Wiley Mill. The data in Table I show clearly that the variations in exposure history of the leather specimens had no appreciable effect on the amount of residual fungicide.

Effect of volatilization.—Volatilization may cause the removal of compounds from materials such as leather and thus cause them to fail to prevent

TABLE I

ANALYSIS OF LEATHERS FOR RESIDUAL AMOUNTS OF 5,6-DICHLORO-2-BENZOXAZOLINONE

Exposure History of Leather Specimens†	5,6-dichloro-2-benzoxazolinone* in	
	Veg. Sole Leather Crust‡ %	Military, Chrome Upper Leather** %
Stored in lab. for 17 mo. after treatment	0.72	0.59
No weathering; 2 mo. in T.R.;†† 15 mo. in lab.	0.77	0.50
3 mo. weathering, sun only; 2 mo. in T.R.; 12 mo. in lab.	0.76	0.50
3 mo. weathering, sun and rain; 2 mo. in T.R.; 12 mo. in lab.	0.74	0.47

*Based on air-dry leather weight. Each value given is the average of duplicate determinations. Accuracy of analytical results is ±0.05%.
†Four specimens were used to prepare one composite sample for analysis.
‡Calculated from treatment to contain 0.78% fungicide.
**Calculated from treatment to con a n 0.66% fungicide.
††T.R. = Tropical Room.

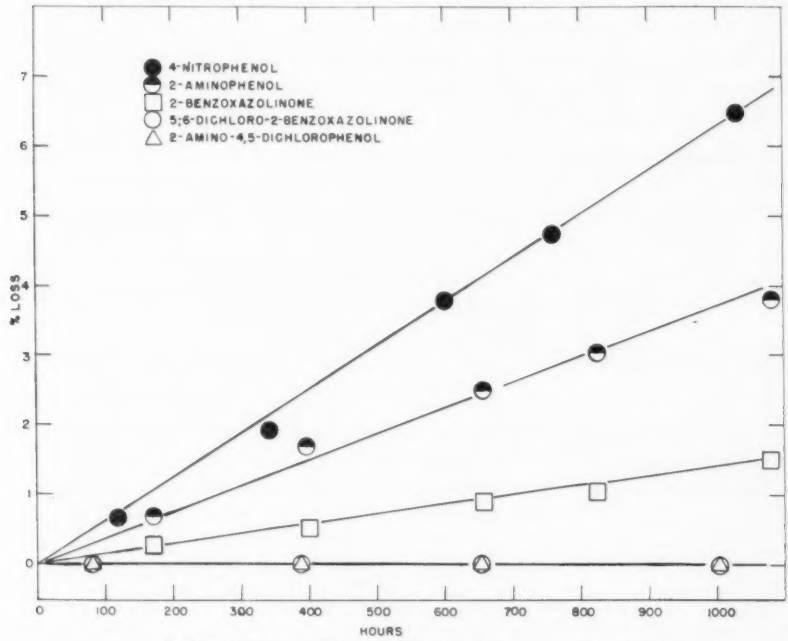


FIGURE 5.—Loss by volatilization of compounds at 40°C.

mildew growth even though they are fungitoxic (3). A simple test of volatility consists of observing the rate of weight loss when the compound, in a shallow, open dish, is heated in an oven at 40° C. (3). Figure 5 shows results that were obtained by this test in the present investigation. In addition to the compounds listed in Fig. 2, 4-nitrophenol was also included in this volatility test; it has previously been established that this compound, which is a leather fungicide currently being used by the U. S. Military Services, is not removed from leather by volatilization under tropical room conditions to any appreciable extent (3). From Fig. 5 it may be seen that no measurable weight loss occurred with 5,6-dichloro-2-benzoxazolinone or 4,5-dichloro-2-aminophenol in 1000 hours of heating at 40° C. 2-Benzoxazolinone and 2-aminophenol were volatilized, but at rates slower than that of 4-nitrophenol. These results exclude the possibility that the ineffectiveness of 4,5-dichloro-2-aminophenol, 2-benzoxazolinone, and 2-aminophenol as leather fungicides could be caused by their removal from the leather by volatilization.

Effect of leaching with water.—Since 5,6-dichloro-2-benzoxazolinone is much less water-soluble than 4-nitrophenol (the respective solubilities at room temperature, as weight percentages, are 0.03 and 1.6), the former could also be expected to be more resistant to removal from the leather by leaching with water. This has been verified by a leaching experiment, the results of which are given in Table II. Under the same conditions approximately 3 times as much 4-nitrophenol as 5,6-dichloro-2-benzoxazolinone was removed from the same type of leather.

Chemical stability.—The analytical method (18) for 5,6-dichloro-2-benzoxazolinone depends on the conversion to 2-amino-4,5-dichlorophenol, i.e., it involves hydrolytic rupture of the oxazo ring. In the analytical pro-

TABLE II

LOSS OF FUNGICIDE FROM LEATHERS BY LEACHING WITH WATER*

	5,6-dichloro-2-benzoxazolinone		4-nitrophenol	
	1	2	1	2
Found in leach water, %	0.24	0.24	0.56	0.46
Found in leached leather, %	0.49	0.47	0.05	0.09
Total, %	0.73	0.71	0.61	0.55
Loss by leaching, %	32.8	33.8	91.8	83.6
	(Av. 33.3)		(Av. 87.7)	

**Leaching procedure*
2.5 g. of ground vegetable sole crust leather were shaken in 100 ml. of distilled water at 23°C. for 2 hours. Leather and water were separated by filtration and analyzed.

cedure, this hydrolysis is achieved by refluxing in approximately 1*N* NaOH for one hour. In cold NaOH no significant hydrolysis takes place, as is evidenced by the fact that no color is produced when the refluxing operation is omitted. Similarly, it can be established that no hydrolysis takes place, even with heating, in 1*N* H_2SO_4 or sulfonated neatsfoot oil. These experiments (Table III) show that 5,6-dichloro-2-benzoxazolinone must be very stable to acid hydrolysis and probably will not decompose to the phenol in leather which usually has a pH of about 3.

TABLE III

CHEMICAL STABILITY OF
5,6-DICHLORO-2-BENZOXAZOLINONE

Treatment	Color test*	Conclusion
1. Refluxed in 1*N* NaOH for 1 hr. (analytical procedure)	positive	hydrolysis
2. Dissolved in 1*N* NaOH, but not refluxed	negative	no hydrolysis
3. Refluxed in 1*N* H_2SO_4 for 1 hr., then as 2 above	negative	no hydrolysis
4. Dissolved in sulfonated neatsfoot oil and heated at 95°C. for 4 hr., then as 2 above	negative	no hydrolysis
5. Dissolved in sulfonated neatsfoot oil and heated at 95°C., for 4 hr., then as 1 above	positive	hydrolysis

*The 5,6-dichloro-2-benzoxazolinone, if hydrolyzed to 2-amino-4,5-dichlorophenol by the treatment, will produce a colored reaction product on diazotization and coupling with resorcinol.

INFLUENCE OF SUBSTRATE ON STRUCTURE-ACTIVITY RELATIONSHIP

The lack of fungitoxic activity of 2-amino-4,5-dichlorophenol, in contrast to 5,6-dichloro-2-benzoxazolinone in leather, does not agree with the structure-activity relationship deduced from toxicity tests of 2-aminophenols and benzoxazolinones against *P. chrysogenum* on agar, reported by Beck and Smissman (7). In the latter tests, the fungitoxic activity of the 2-aminophenols was found to be at least as high as that of the benzoxazolinones. This variance could possibly be due to different responses of *P. chrysogenum* and the organisms constituting the microflora of the tropical room. Horsfall (19) has discussed the unequal ability among organisms for enzymatic oxidation, and thus detoxification, of phenols. *P. chrysogenum* may not possess this

ability, whereas some of the organisms of leather mildew in the tropical room may possess it.

Since *A. niger* is an organism that is prominent in leather mildew, it is of interest to compare the inhibition of *A. niger* and *P. chrysogenum* by these compounds in agar medium. The results shown in Fig. 6 were obtained in fungitoxicity tests performed at the Quartermaster laboratories using the

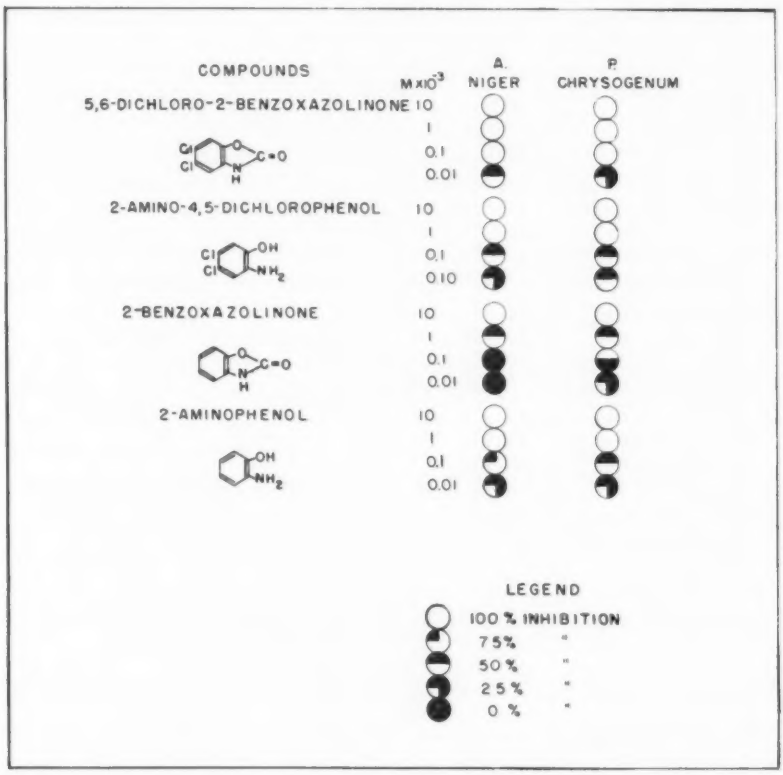


FIGURE 6.—Inhibition of growth of *A. niger* and *P. chrysogenum* by 5,6-dichloro-2-benzoxazolinone, 2-benzoxazolinone, and the two corresponding phenols in agar.

agar petri dish technique (4). The response of the two organisms was virtually the same, and the aminophenols were definitely fungitoxic. 2-Amino-4,5-dichlorophenol was less, and 2-aminophenol was more, potent than the corresponding 2-benzoxazolinones. The results thus verify the findings of

Beck and Smissman. They also suggest that enzymatic detoxification by the organisms probably is not the cause of inactivity of the aminophenols in leather.

Other factors that could account for the discrepancy in test results might arise from the different substrates. The fibrous structure of leather, with greater surfaces exposed to air, may permit easier air oxidation of the phenols and thus produce detoxification without the aid of enzymes. In addition, the complex and heterogeneous nature of leather must be considered. In converting animal skin to leather other compounds of biological origin, such as tannins, animal oils, organic acids, and enzymes, are added or used in processing. Biological materials are known to be especially effective in detoxifying antimicrobial agents by adsorption or reaction (20). From these considerations it is clear that for final testing of leather fungicides it is essential to use a leather substrate and test conditions similar to those under which the fungicide is to be employed.

SUMMARY

An effective mildewproofing treatment can be achieved by incorporation of about 0.4% of 5,6-dichloro-2-benzoxazolinone in leathers. This concentration should be adequate for the most mildew-susceptible leathers, such as vegetable-tanned sole leather. Approximately 0.2% is adequate for chrome-tanned leather. The compound is virtually colorless, less volatile and water-soluble than 4-nitrophenol, and stable under acid conditions. It is much more effective than 2-benzoxazolinone, indicating that the chlorine substituents play an important role. It is also much more effective than 2-amino-4,5-dichlorophenol. This observation is at variance with the fungitoxic activity of these compounds in agar medium tested against *P. chrysogenum* and *A. niger*. A possible explanation for the different results in leather and in agar is that detoxification of the phenol occurs by air oxidation or by interaction with leather components.

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Received September 28, 1961.

ADDRESS*

by

PROF. DR. W. GRASSMANN

PRESIDENT, I.U.L.C.S.

at the

Seventh Biennial I.U.L.C.S. Conference†

In the history of the cooperation of technicians and scientists in the tanning industry some events deserve to be regarded as milestones.

First is the foundation of the International Society of Leather Trades Chemists, founded on the initiative of Richardson Procter in 1897 in London, that is to say, 64 years ago.

Second is the re-establishment of the International Union of Leather Chemists Societies on the strength of the resolution of the I.S.L.T.C. in London in 1947. This re-establishment was the beginning of an era of peaceful cooperation in all questions of mutual interest after a period of unhappy disunity and the destruction of all international cooperation as a result of two world wars.

Third, we may name this very day. Today for the first time we meet outside Europe, and this is a clear indication that the cooperation of technicians and scientists in our field is not only a concern of European nations but of the societies of the whole world, that is to say that it is not only international but intercontinental.

It was almost to be expected that this first meeting outside Europe would lead us to America. The American Society is not only the second largest society of the Union with respect to membership—and of course it is the largest of the non-European member countries—but we also owe to American research work a number of very significant scientific and technical advances in our field within the last decade. We would also like to mention with gratitude that a large number of our American colleagues have found it possible to attend all international meetings up to now, regardless of the difficulties and expense involved in a trip across the Atlantic. Therefore it is a great pleasure for their European colleagues and for me to return these visits.

*Dr. Grassman, an able linguist, employed four languages (English, French, German, and Italian) during the delivery of his speech.

†Held in Washington, D. C., Aug. 20–25, 1961.

Because our visit has brought 101 Europeans and 10 participants from other continents to the USA, and because according to the program 14 participants from America, 16 from Europe, and two from India will deliver a paper, I may say that this attempt of a return visit as well as a real intercontinental congress is successful on the whole.

I say "on the whole" because three of the seven members of the Executive Committee are unable to be present. They are our 2nd Vice-President Prof. G. A. Bravo and the Hon. Secretary Mr. Forsyth, both of whom have suffered heart attacks, and the Hon. Treasurer Prof. Burton, who because of his health could not risk the climate in Washington at this time of year. Mr. Forsyth will be represented by Mr. Marcus Harrison, and Prof. Burton by Prof. Ward. We owe special thanks to these two gentlemen for their readiness to act for Prof. Burton and Mr. Forsyth, and I want to ask you for your consent to send to those absent in the name of the Congress and in the name of the members of the Executive Committee who are present our hearty wishes for their quick recovery.

In our joy that this attempt of an intercontinental conference is at least on the whole successful we must not forget to mention the difficulties—above all, those of a financial kind—which arose for many participants from abroad. We want to thank everyone who had to dip more or less deeply into his purse, all firms which are paying the travelling expenses of their chemists and technicians, and all those numerous governmental institutions and scientific organizations of the individual countries which have made these trips possible. I want to express my sincere thanks on behalf of all concerned.

I wish also to thank the Host Society, the American Leather Chemists Association. I thank them with special pleasure for their invitation, for all their work and efforts, and for the time and money they have devoted to this congress and will devote to it in the next few days in order to satisfy everybody. Furthermore, I should like to express my special gratitude to the presiding board of the ALCA, Dr. Reuben Henrich, Dr. Robert Stubbings, and Dr. Fred O'Flaherty, to Mr. H. K. Dugdale, President of the Tanners' Council of America, and to Mr. Dominic Meo, the chairman of the local congress committee, and his coworkers Mr. Mieth Maeser, Dr. Wallace Windus, Dr. H. G. Turley, and Dr. J. R. Kanagy, who have managed the technical program of the congress. And finally I want to thank the numerous unmentioned helpers; from my experience at the Munich Congress two years ago I know how much work has to be done to ensure the success of a meeting like this.

Since our last convention in Munich the admission of the Association of Turkish Leather Chemists, in accordance with the decision reached there, has become an accomplished fact with all the necessary formalities having been completed.

I would like to extend greetings to the Turkish Association and to greet with especial cordiality its representatives present here, led by our old friend Professor Gerngross, who has long maintained a personal membership in the German Association for Tanning Chemistry and Technology and its predecessor, the IVLIC.

Membership applications have been presented by associations from Japan and Israel, and I have no doubt but what the delegates will approve these membership applications this coming Wednesday, August 23. Our Union will then include 21 national associations, with a total of approximately 5,500 members. Of these, there are 14 associations with 4,000 members from Europe, two organizations with 856 members from North and South America, and five organizations with 150 members from the remaining continents. The fact that the proportion of national associations outside Europe and America has shown a relatively sharp rise in just the last few years appears to me to be a natural and predictable development. However, the distribution of our members on one hand and the high cost of trips overseas on the other would seem to justify our desire to attempt to hold the conventions of the next several years in Europe again.

After our report on the growth of the organization, it seems only fitting to pay grateful respect to the memory of those who have left us in the last two years. They are: E. C. Snow, A. B. Craven, Robert Shaw, T. Fasol, and H. Gnamm; J. R. Blockey, who was active over a long period of years in a leading position with the British Association and directed the International Federation of Leather Chemists' Associations from 1950 to 1951; R. Frey, Sr., who was President of ALCA from 1930 to 1932 and also an outstanding expert of the Department of Agriculture in Washington; Dr. A. Gansser,who was one of the oldest members of our association and President of the I.S.L.T.C. from 1921 to 1926. With him we have lost one of the most distinguished experts in that field of investigation dealing with the fight against the warble fly. Dr. Gansser's death has left an extraordinary gap in our circle, not only from a scientific standpoint, but also from a human one.

If I may review for you and myself the locations of our last international conventions, Munich, Rome, Stockholm, and Barcelona, we will realize how different all of these places were, yet in what measure they all made an attempt at and succeeded in showing us their particular individuality and in making the days within their walls into a living memory for all of us!

Professor Bravo, who could not be here with us today, in his address given two years ago in Monaco, praised the uniqueness of this city in having remained a village of a million inhabitants—a "Millionendorf", as we say in German—a place that strives to combine the functions and vitality of a big city with the calm and joy of living—or, as we say in German, with the "Gemutlichkeit"—of a Bavarian village.

As different as the two cities Munich and Washington are, they have one thing in common: that they did not make the transition from a village, or, let us say, from a small rural town, to a large city until a century and a half ago, and that in those days their broad avenues with magnificent public edifices were built "completely senselessly" out in the empty fields, here at the direction of the presidents, there upon the command of the kings. The arrangements which today we admire as masterpieces of far-sighted municipal planning were accompanied in those days by the disapproving astonishment of the citizenry. And so today we find ourselves in Washington, in a world metropolis, a city which, through its inhabitants with their resourceful president, J. F. Kennedy, at their head, has taken upon its shoulders a goodly portion of the responsibility for the fate of our world, a responsibility the weight and significance of which we are especially inclined to recognize with awe in these times.

When I was in the U.S.A. the last time—it was twenty-five years ago on an educational trip which a rather large group of the German leather industry conducted to the United States—one thing in particular struck me:

Among us there were many tanners who each had a small or middle-sized tanning establishment in one or another provincial German city, and I thought about these people—at that time I was still younger and more inexperienced than today—that they had never looked too much beyond the walls of their own town. And on the trip these people suddenly revealed themselves to be people of great worldly experience; they spoke a number of foreign languages fluently and knew the large cities and ports of the world as well as the living habits of other countries. How can we account for this? The leather industry is actually much more closely connected with the world beyond the ocean than many other branches of the economy. Its raw materials, whether these are hides or tanning substances, come from the marketplaces of the entire world, and it was a fine tradition, unfortunately interrupted by two world wars and their results, that the young son of a European tanner could not take over a function of genuine significance in his father's establishment before he had spent one or two years overseas, in Argentina or Paraguay, perhaps in Abyssinia or India. There were and are hides and hide markets everywhere, and where these are present one also finds business relationships and business friendships which make such journeyman's years overseas possible and fruitful.

This may be one reason for the fact that the people from the leather industry have lived and thought in a manner which has always included the whole world and have always maintained international contacts with particular pleasure. A *second* point, which is perhaps more in the consciousness of us scientists working in leather than in that of people working in the actual industry, seems to me to be the following:

In no land is the leather industry to be counted among the really leading and controlling industries, as, for example, coal, iron, or chemistry; its contacts with other industries are, with an exception perhaps in the case of the chemical industry, comparatively weak. It maintains a special type of existence of great individuality in its country, and only a few and relatively small localities, those actual tanning towns, bear the stamp of its influence. The same thing is to be said about us scientists in the leather trade. Only a few of the countries represented here have two or three institutes which are primarily concerned with questions of the leather industry. And in most countries there are only two of these, or sometimes just one. Within the institutions of higher learning and larger scientific centers to which they belong, these leather institutes must yield precedence to the research institutes of other fields because of the stated reasons of size, and they are undoubtedly isolated also, to a certain extent, regarding the things with which they deal. The investigator working in the field of leather will be able to speak with his colleagues from the university about general questions of the chemistry of natural substances, about protein or colloid research, and with his colleagues from the technical institutes, for example, about questions of the application of synthetic substances, techniques of extraction or drying, or those of testing the materials to be worked on; however, with his own central "leather problems" he will always be dependent upon himself and upon contact with only a few colleagues in his country. Thus it is understandable that our view extends over the borders of our own countries and that we seek every opportunity for discussing our results, thoughts, and impressions with expert colleagues from outside and for receiving criticism and stimulation from their localities. I believe that this certain isolation within their own countries is the chief reason for the fact that the not very numerous specialized representatives of the individual countries are bound close to one another through numerous organizations and often through bonds of close personal friendship—that, to a certain extent, they feel themselves to be one large family which gladly takes advantage of every opportunity of meeting together, and which is prepared to bear common troubles together.

And now I should like to address those who contribute most to the maintenance of international friendships, and who, in between congresses, always look forward to meeting again—our dear ladies! I don't intend to make a speech here in their honor—that will be done by someone more competent and at a later time—but I would not like to miss this opportunity to wish you ladies who are present a particularly warm welcome and to remember those who are absent this time but whom we hope to see again at the next congress.

As for us—leather scientists and technologists—our common tasks and concerns form a bond, a feeling of unity, which transcends all borders. The

leather industry has not participated in the same degree as other industries in the economic growth that we have seen in many European countries and in the United States. This is evidently due to the progress of plastics. Other reasons, perhaps of equal importance but less apparent, are doubtless the division of the world into two major political and economic blocs and the development of countries which had practically no industry twenty or so years ago. All these facts create serious problems not only for the industries of the industrialized nations of Europe but also for America, and a high degree of adaptability and flexibility is required to solve them. We must not let things go; neither must we be too pessimistic about our situation. If wool and cotton are replaced by synthetic fibers, it will be necessary to reduce proportionally the flocks of sheep and the cotton fields. However the livestock of the world will not decrease in number—on the contrary it will increase in the near future as the human population and standards of living increase and as agricultural lands are more efficiently cultivated. The population growth will in turn increase the demand of mankind for footwear and for handbags, a considerable part of which will always be made of leather. So it is that also in the future every hide will be tanned, which means, of course, a more or less large profit for the tanner.

The technician and scientist in the field of leather cannot undo those great developments in technology and international economics which trouble our leather industry. What we can do is, perhaps, the following:

(1) Introduce improvements into all tanning processes in order to diminish the large price differential between leather and plastics as far as possible. In doing this, we will not be able to shy away from taking completely new paths under certain circumstances, particularly those which, while maintaining quality, lead to a shortening of the tanning period and a reduction of uneconomic handwork. Something else which, in my estimation, must be done but which lies solely in the field of the merchants appears to be the introduction of improvements of the lengthy and expensive route which leads from the leather producer via the processer to the final consumer.

(2) Improve the quality of leather, particularly with regard to those properties in which leather is not quite equal to its substitute materials. The working out of testing methods until a test is available which really yields results parallel to those by which the practical consumer worth of leather products is judged constitutes the most basic problem in a group of problems which are the concern of many national and international committees of the Union and of our individual associations.

(3) Exploit all those properties in which leather, the way things stand now, is basically superior to synthetic plastics thanks to the peculiarity of its

biological formation and its chemical structure. Investigations of this type show the leather producer in his struggle with the plastics industry which fields of application his chances are good in and those in which they are questionable. To be sure—and this is the reverse side of the coin—they also show the plastics producer what points he should concentrate his efforts on in order to overtake leather finally. To what extent this may ultimately be successful is evident to me when I compare my principal remarks in Rome four years ago with those on the current status of this problem, in particular those relating to the replacement of upper leather.

All these questions have been thoroughly worked upon within the last few years in the industrial and research laboratories of our field and in the appropriate special committees of our associations. Our German Association, for example, has established a small committee on problems of leather and plastics which is especially intended to study the effect upon the economy of the leather industry, in addition to our association's expert committees which have been in operation for a long time, such as those for testing physical and chemical properties of leather, for leather dyeing and durability of the dyeing, and for surface leather and heavy leather. The attempt to coordinate these tasks on an international basis has made progress only in the field of leather testing methods. For the special struggle with the competition of plastics, the so-called Joint Committee has been established by the International Tanners' Council and our Union. However, no meeting of this Committee has been called since its first meeting in London in 1958, because a new meeting is not felt to be desirable by the I.T.C. until a group of questions is solved through the results of research, or at least important partial progress is obtained in this direction. I have the impression that along with this argument, which is not easy to understand, many kinds of regulations inside the individual countries are playing a part, regulations which generally stand in opposition to a really full exchange of research results or of planning on an international basis.

I understand very well that this problem also needs a serious discussion, but I believe that it should be clear to the tanners of all countries, or should slowly become clear to them, that they are all sitting in *one* boat. The assistance of our Union, which is certainly no organization of leather industrialists, but rather an organization of those technologists and scientists working in or for the leather industry, is always at the disposal of the official international organization of tanners, but it is their task to make use of this assistance.

Pure research in the field of the basic elements of leather production is enjoying an excellent degree of fulfillment from exchanges of the fruits of work

conducted in the laboratories of the most varied countries. I would like to attempt to describe this to you within the next few days in connection with collagen research; however, there are enough other groups of problems in which one could demonstrate the same thing, such as the investigation of vegetable tanning substances, the theory of tanning processes, or leather dyeing. But the question of to what extent and within what periods of time this progress will be able to be absorbed into practice in leather production is more difficult. Proper coordination between basic research and practical problems of development is, to be sure, more problematic in the leather industry, which builds upon an empirical tradition handed on from father to son and which, moreover, is occupied with the most complicated substances in hides and tanning materials, than, for example, in the field of chemical industries, where progress in the basic research of today is the self-evident foundation of the technical developments of tomorrow.

Almost every really great bit of progress in chemistry has had its effect upon the field of leather production, and sooner or later it has yielded far-reaching changes in our manner of thinking and our practical methods of work. At the beginning of this century it was complex chemistry, without which the development and control of chrome tanning would not have been possible, and colloidal chemistry, which enabled phenomena, as, for example, those connected with soaking, to be dealt with exactly for the first time. After the first World War it was the development of synthetic plastics which not only gave us difficulties and competition but also—let us not forget this—brought with it decisive progress, for example in the field of leather currying. Today it is the progress, particularly the methodological progress, in research on natural substances in general and in high-molecular natural substances (especially proteins) in particular which has brought with it the penetration by exact research of fields which lie between those of biological and chemical structure. The research in the collagen field shows this impressively. However, progress in determining the nature of intermolecular forces which enables us to understand the behavior of hide fibers and the essence of many tanning and dyeing processes, chemical-therapeutic research, and the revolution in the fight against the warble fly are also to be included here. In ten years we will know better than today what kind of practical effect these things have upon leather production. Those so exciting reports about new working materials based on collagen have given us, to be sure, some indication where new progress and knowledge of a purely scientific nature can lead in this field as a matter of principle, although we can by no means foresee what has actually been achieved at this moment.

However things may develop, it seems certain to me that they will require a greater mobility than hitherto, the ability to adapt to new results and situations quickly, to throw aside the traditional customs and techniques of our

leather industry. We must continue on the path which leads from mere handicraft to the science of chemistry in its various aspects. For that we need the right men in laboratories and firms. It is said that contact between the scientist and the practical man is particularly difficult in the leather industry. If this is true, it is up to us to alter it. What we want are, on the one hand, scientists with a complete modern, as well as a broad and thorough, academic education, experienced in tanning processes if possible, who see things as they are and who do not forget to discuss all urgent questions, new possibilities, and experiences with the master-craftsman; and what we want on the other hand are enough trained technicians who have been taught sufficient chemistry (as well as a little physics and biology) restricted to essential facts, in a modern way, to be able to discuss questions that arise, to understand the essentials of new processes as well as current practices, to know the basic chemical properties of new products, to perform experiments systematically and logically, and to interpret the results achieved. We also want them to read and understand—perhaps not in all details—the scientific and technical papers in our journals or listen to lectures at our congresses.

To achieve this is mainly a question of systematic training and a task of our industry as well as of the International Union of Leather Chemists' Societies, as far as it is feasible. May this congress, whose program shows such a good balance of science and practice, also be a contribution to this type of education—a further step to improve the contact between practical men and scientists. And may it be also a small contribution to the cooperation and the mutual understanding of the nations of the world, factors which are extremely important at this moment.

Herewith I declare opened the Seventh Congress of the International Union of Leather Chemists' Societies.

LIFE LINES

Brief Biographies of Our Contributors

SVERRE DAHL received his B. S. degree from Drury College, Springfield, Mo., and did graduate work at the University of Kansas City, Kansas City, Mo. Prior to joining the National Bureau of Standards in 1947, he worked for the Bureau of Reclamation at Fort Collins, Colorado, and in private industry in the midwestern states. Since coming to N.B.S. he has been active in the development of test methods for leather and has served on several ALCA committees. In addition, he has been engaged in studies on mildew-proofing treatments for leather. He joined ALCA in 1951.

PROF. DR. W. GRASSMANN—See p. 400 of the August *JALCA*.

DR. ARTHUR M. KAPLAN was graduated from the University of Massachusetts in 1939 and received his M.S. at the State College of Washington in 1941. Following World War II duty as a bacteriologist in the United States Naval Reserve (he attained the rank of Lieutenant Commander), he joined the staff of the Department of Food Technology at the Massachusetts Agricultural Experimental Station, Amherst. He earned his Ph.D. at the University of Massachusetts in 1948. From then until 1953 he served as microbiologist in Beltsville, Maryland, with the U. S. Department of Agriculture. Since 1953 he has been chief of the Microbiology Section, Chemicals and Plastics Division, Quartermaster Research and Engineering Center, Natick, Massachusetts. Dr. Kaplan's main interest at present is in the prevention of microbiological deterioration or contamination of materials.

ALCA NEWS

Proceedings, Reports, Notices, and News

of the

AMERICAN LEATHER CHEMISTS ASSOCIATIONS

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Harold Y. Miller, Seton Leather Company, 62 Verona Avenue, Newark, New Jersey

PAST PRESIDENTS

G. A. Kerr, W. H. Teas, H. C. Reed, J. H. Yocum, F. H. Small, H. T. Wilson, J. H. Russell, F. P. Veitch, W. K. Alsop, L. E. Levi, C. R. Oberfell, R. W. Griffith, C. C. Smoot, III, J. S. Rogers, Lloyd Balderston, J. A. Wilson, R. W. Frey, G. D. McLaughlin, Fred O'Flaherty, A. C. Orthmann, H. B. Merrill, V. J. Mlejnek, J. H. Highberger, Dean Williams, T. F. Oberlander, A. H. Winheim, R. M. Koppenhoefer, H. G. Turley, E. S. Flinn, E. B. Thorstensen, M. Maeser.

POSITION WANTED

CHEMIST-ENGINEER—Process superintendent in tannery, French, 43 years old, wishes a job in the United States. Write Box 241, Secretary of American Leather Chemists Association, Campus Station, Cincinnati 21, Ohio.

AUDIT REPORT

THE AMERICAN LEATHER CHEMISTS ASSOCIATION
CINCINNATI, OHIO

DECEMBER 31, 1960

February 21, 1961

THE AMERICAN LEATHER CHEMISTS ASSOCIATION, INC.
THE UNIVERSITY OF CINCINNATI
CINCINNATI, OHIO

GENTLEMEN:

In accordance with the request of Dr. Fred O'Flaherty, Secretary-Treasurer, we have examined the balance sheet of The American Leather Chemists Association, Incorporated, as of December 31, 1960, and the related statements of income and surplus for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

The report of the examination is presented herewith, together with the following exhibits:

EXHIBIT I: Balance Sheet at December 31, 1960, and comparison with December 31, 1959.

EXHIBIT II: Statement of Income for the year ended December 31, 1960, and comparison with the year ended December 31, 1959.

EXHIBIT III: Statement of Surplus for the year ended December 31, 1960, and comparison with the year ended December 31, 1959.

The commercial account balance on deposit with the Central Trust Company was confirmed independently and was reconciled with the cash account balance of the Association.

Accounts receivable were not circularized; this procedure was considered unnecessary in view of the small balance of each account, and in view of the fact that of the total accounts receivable of $2,121.31 at December 31, 1960, approximately seventy-nine per cent ($1,683.02) of the total was collected in January, 1961. By other auditing procedures, we have satisfied ourselves of the accuracy, validity, and collectibility of the accounts.

The investment securities, were confirmed by Dr. Fred O'Flaherty. In addition, we examined the bonds in detail. All bonds are in the safe deposit box at the Central Trust Company.

In 1960, The Series F bonds were cashed at par of $5,000.00, and in November, 1960, United States Treasury bonds (3%) were purchased at a cost of $4,956.25; these bonds mature February 15, 1964, at a par value amount of $5,000.00.

In the year 1960, all bond investments earned interest of $1,502.64.

Dues received in advance totaling $112.00, advertising received in advance totaling $27.75, and subscriptions received in advance totaling $3,584.73 were verified in detail and were reconciled with the controlling accounts.

Net income for the year ended December 31, 1960, was $2,826.17, compared with $1,200.79 for the year ended December 31, 1959, or an increase of $1,625.38. The causes of the increased net income are analyzed in Exhibit II. In the year 1960, revenues increased $531.16, and expenses decreased $1,094.22. The net income is satisfactory, but it is not totally in accordance with the modern financial trend. Again, it is recommended that dues to members of the Association be increased, and that advertising and subscription prices (to non-members) be increased. Secretarial and editorial salaries have not been increased for several years.

In our opinion, the accompanying balance sheet and related statements of income and surplus present fairly the financial position of The American Leather Chemists Association, Incorporated, at December 31, 1960, and the results of its operations for the year then ended, in conformity with generally accepted principles of accounting, applied on a basis consistent with that of the preceding year.

Respectfully submitted,

ARTHUR W. HOLMES
Certified Public Accountant

EXHIBIT I

THE AMERICAN LEATHER CHEMISTS ASSOCIATION, INC.
BALANCE SHEET AT DECEMBER 31, 1960
AND COMPARISON WITH DECEMBER 31, 1959

	December 31, 1960	December 31, 1959	Increase or Decrease* 1960 over 1959
ASSETS			
Current Assets:			
Cash on hand	$ .99	$ 2.12	$ 1.13*
Cash in bank	13,062.43	7,670.86	5,391.57
Accrued interest on investments	706.25	–0–	706.25
Accounts receivable, advertisers	1,645.45	600.85	1,044.60
Accounts receivable, reprints	165.36	124.45	40.91
Accounts receivable, directory	310.50	–0–	310.50
Prepaid copyright	76.00	–0–	76.00
Total Current Assets	$15,966.98	$ 8,398.28	$7,568.70

	December 31, 1960	December 31, 1959	Increase or Decrease* 1960 over 1959
Investments:			
U.S. Savings bonds, Series F (cost $3,700.00) sold in November, 1960, for $5,000.00	–0–	$ 4,810.00	$4,810.00*
U.S. Treasury bonds, 2.5%, 1967-1972, at cost	$33,207.50	33,207.50	–0–
U.S. Treasury bonds, 2.5%, 1963-1968, at cost	8,842.50	8,842.50	–0–
U.S. Treasury bonds, 2.25%, 1959-1962, at cost	10,000.00	10,000.00	–0–
U.S. Treasury bonds, 3%, due February 15, 1964, at cost	4,956.25	–0–	4,956.25
Total Investments	$57,006.25	$56,860.00	$ 146.25
Total Assets	$72,973.23	$65,258.28	$7,714.95
LIABILITIES AND CAPITAL			
Current Liabilities:			
Accounts payable	$ 28.87	$ 80.08	$ 51.21*
Federal income tax withheld	191.02	211.02	20.00*
City income tax withheld	12.25	13.01	.76*
Advertising received in advance	27.75	27.75	–0–
Dues received in advance	112.00	230.33	118.33*
Subscriptions received in advance	3,584.73	3,448.87	135.86
ALCA International Meeting	4,200.00	–0–	4,200.00
Wilson Memorial Lecture Fund	743.22	–0–	743.22
Total Liabilities	$ 8,899.84	$ 4,011.06	$4,888.78
Capital:			
Earned surplus (Exhibit III)	$62,073.39	$60,247.22	$1,826.17
Reserve for foreign meetings	2,000.00	1,000.00	1,000.00
Total Capital	$64,073.39	$61,247.22	$2,826.17
Total Liabilities and Capital	$72,973.23	$65,258.28	$7,714.95

EXHIBIT II

THE AMERICAN LEATHER CHEMISTS ASSOCIATION, INC.

STATEMENT OF INCOME

FOR THE YEARS ENDED DECEMBER 31, 1960, AND DECEMBER 31, 1959

	December 31, 1960	December 31, 1959	Increase or Decrease* 1960 over 1959
Revenues, General:			
Dues, including Journal subscriptions	$11,310.00	$11,174.00	$ 136.00
By-laws and methods booklet	76.40	93.40	17.00*
Directory	1,164.04	850.12	313.92
Interest income	1,502.64	1,465.00	37.64
Total General Revenues	$14,053.08	$13,582.52	$ 470.56
Revenues, Journal:			
Advertising	$14,376.00	$14,057.92	$ 318.08
Subscriptions	6,158.83	6,026.31	132.52
Journal sales	1,211.25	849.58	361.67
Reprints	1,400.15	2,163.32	763.17*
Dues: ISLTC	759.00	747.50	11.50
Total Journal Revenues	$23,905.23	$23,844.63	$ 60.60
Total Revenues	$37,958.31	$37,427.15	$ 531.16

	December 31, 1960	December 31, 1959	Increase or Decrease* 1960 over 1959
Expenses, General:			
Salary of Secretary	$ 4,600.00	$ 4,600.00	–0–
Office operating expense	1,178.63	739.73	438.90
Uncollectible account expense	289.00	358.00	69.00*
Directory expense	1,118.65	1,064.49	54.16
By-laws and methods	–0–	674.20	674.20*
Annual meeting expense	293.99	176.64	117.35
Council meeting expense	50.30	77.00	26.70*
Auditing	225.00	200.00	25.00
Leather Chemists Union dues	198.50	120.09	78.41
Total General Expenses	$ 7,954.07	$ 8,010.15	$ 56.08*
Expenses, Journal:			
Printing	$20,999.27	$21,038.28	$ 39.01*
Managing editor, compensation	2,500.00	2,499.96	.04
Managing editor, expense	435.15	359.84	75.31
Editor in chief, compensation	600.00	600.00	–0–
Editor in chief, expense	106.83	146.56	39.73*
Miscellaneous expense	24.79	22.00	2.79
Storage	350.00	350.00	–0–
Insurance	42.00	60.00	18.00*
Copyright registration	4.00	48.00	44.00*
Reprints	1,544.86	2,237.10	692.24*
Exchange charges	10.56	6.18	4.38
Translations and abstracts	422.33	390.04	32.29
Committee expense	–0–	10.00	10.00*
Advertising written off	–0–	300.60	300.60*
Advertising discounts allowed	138.28	147.65	9.37*
Total Journal Expense	$27,178.07	$28,216.21	$1,038.14*
Total Expenses	$35,132.14	$36,226.36	$1,094.22*
Net Income	$ 2,826.17	$ 1,200.79	$1,625.38
Net income distributed: General	$ 6,099.01	$ 5,572.37	$ 526.64
Journal	(3,272.84)	(4,371.58)	1,098.74
Total	$ 2,826.17	$ 1,200.79	$1,625.38

EXHIBIT III
THE AMERICAN LEATHER CHEMISTS ASSOCIATION, INC.
STATEMENT OF EARNED SURPLUS
FOR THE YEARS ENDED DECEMBER 31, 1960, AND DECEMBER 31, 1959

	Year Ended December 31, 1960	Year Ended December 31, 1959	Increase or Decrease* 1960 over 1959
Balance, January 1	$60,247.22	$60,046.43	$ 200.79
Add Net Income:			
General	6,099.01	5,572.37	526.64
	$66,346.23	$65,618.80	$ 727.43
Deduct Net Loss:			
Journal	3,272.84	4,371.58	1,098.74*
	$63,073.39	$61,247.22	$1,826.17
Deduct:			
Allocation to reserve for foreign meetings	1,000.00	1,000.00	–0–
Balance, December 31	$62,073.39	$60,247.22	$1,826.17

SECRETARY'S NOTICE

The Secretary's office has twelve copies of the ten-year index (1906-1915) of the *Journal of the American Leather Chemists Association* available. Copies may be purchased for $1.00 while the supply lasts.

MUTUAL MEMBERSHIP DUES

The Secretary of the Society of Leather Trades' Chemists announces that the dues for mutual members beginning January, 1962, will be increased to $6.00 a year.

ADDRESS OF WELCOME

R. G. Henrich

President, ALCA

Seventh Biennial I.U.L.C.S. Conference

Washington, D. C.

Professor Dr. Grassman, Members of the Affiliated Societies, Honored Guests, Ladies and Gentlemen,

It is a pleasure to welcome you on behalf of the American Leather Chemists Association to the Seventh Biennial Congress of the International Union of Leather Chemists Societies. As you know, this is the first time an international meeting of leather chemists has been held in the United States.

The First International Meeting of Leather Chemists was held in 1897. Among those in attendance was Procter, whose work is well known to all of us. At that time leather chemists were mainly concerned with analytical procedures. Vegetable tannages were predominant in leather manufacture. Mineral tannages were in the experimental stages, although in 1858 Knapp described a method for tanning skins with salts of aluminum, iron, and chromium.

This organization continued to World War I as the International Association of Leather Trades Chemists. It was not revived after the war; instead, several separate groups were formed, mainly the British and German, each one including several other countries. Each group published its own tech-

nical journal. This continued until World War II, when these organizations were again disrupted.

After the war Mr. Harvey was instrumental, I understand, in again organizing an International Group, this time to be a federation of the individual societies, as discussed at a meeting in London in November of 1947. This was the beginning of the International Union of Leather Chemists Societies. Officers were elected, and a Constitution was drawn up. The American Leather Chemists Association, organized in 1903, on invitation from the Union and by action of its Council in February, 1949, became a member of the International Union. The first conference was held in Paris in September, 1949, at which time there were seven paid member Societies. The American Leather Chemists Association did not officially participate in this meeting, although one of our members, Dr. Harold G. Turley, was present and was later elected a member of the Executive Committee. Our first official delegates to a conference were Dr. Turley and Dr. Kanagy. Thus, from a comparatively small group, the Union has grown until now, at this the Seventh Biennial Conference, it comprises nineteen constituent societies from all parts of the world. We hope that it will continue to grow in size and influence.

During the past sixty-odd years, a gradual transition has taken place. Mineral tannages are now predominant. Vegetable tannins have not been abandoned but are used to a large extent to modify and improve characteristics in leather not able to be achieved with mineral tannages alone.

Since 1913, when Stiasny first presented to the industry a new product which he called a syntan, many others have been prepared and come into commercial use. Time does not permit me to elaborate on all these materials, but suffice it to say that the majority of mineral-tanned leathers today have been exposed to some syntan in the process of manufacture.

In the coloring of leather, the change from vegetable coloring materials to dyes synthesized by organic chemists is universal. These dyes make it possible to make colors today that were unheard of 60 years ago.

In the fatliquoring of leather, oils in use today have been chemically modified, allowing the tanner to obtain results not heard of in the past.

In the finishing of upper leathers, natural materials such as albumins, casein, and shellac are still used, but resins developed by chemists and having very desirable properties are used to a great extent on many leathers. New and modified resins are appearing, some of which give leather a greatly increased resistance to scuffing.

I believe the transition of the world's leather chemist societies and their journals from analytical chemistry to applied and basic research is apparent to all. Analytical methods are important, and many are still in dire need of

improvement. Needless to say, the broadening of the field of leather chemistry has been desirable. It has also been fruitful.

But has the stature of the technically trained man, the leather chemist, kept pace? Sixty years ago, the leather chemist was chiefly confined to the laboratory in a tannery, doing analyses. Today, many chemists are supervisors of leather production. However, I believe it is a fact that there is a higher percentage of technically trained men in the managerial positions in Europe than in America. There should be a closer liaison between the academic worker and the tanner. Both would profit from the association.

Leather has served the public for centuries. It might seem that there is little opportunity for technical advancement, but there has been a transition from ART to Science and Art.

The past decade has seen the greatest advances. Industry-wide research programs have been inaugurated in various countries of the world. Another important cause of advances being made in leather technology has been the challenge of synthetics being offered as leather substitutes. Yet LEATHER remains the standard for the judging of these synthetics.

What are some of these advances? I shall name only a few:

The advent of the vulcanized shoe has required the development of heat-resistant leathers. This permits the vulcanization of the upper to the bottom.

New treatments to impart water repellancy to dress leathers have been developed.

Sole leathers impregnated with various organic materials giving them greatly increased wear and water resistance have been developed and are in use.

Washable leathers are now available in glove and garment leathers. They are truly washable and dry with no change in character.

New finishes are constantly being developed. Today leather is the basis of style, utility, and comfort.

The program to be presented at this Congress is of interest to everyone. Papers will cover from the practical to theoretical subject matter, from the economics of the industry to differences in practice between American and European tanners. Today the chemist is interested in improvement of leather quality, in knowing more intimately the structure and reactions of collagen. The session devoted entirely to collagen should be of special interest to all of you.

New ideas and concepts should be welcomed and thoroughly investigated, for without them there is no progress. Sherman Perry once said, "The biggest coward in the world is the man who is afraid of a new idea."

To those of you who came to this conference from other lands, may the time you spend here be enlightening and profitable to you. We are happy to have you in our midst and will do our utmost to make your visit here a pleasant one.

I trust the fellowship we share this week will enrich us all, and that the friendships formed here will endure.

WASHINGTON CONFERENCE

INTERNATIONAL UNION OF LEATHER CHEMISTS SOCIETIES

The joint 7th Biennial Meeting of the International Union of Leather Chemists Societies and the 57th Annual Meeting of the American Leather Chemists Association in Washington has now passed into the record. This conference was by all odds the most interesting and perhaps the most important that we have ever held. Although such international conferences have been held in Europe since 1897, it was the first time that such a meeting had been held in the United States. May we all hope that there will be more meetings held in America. We need such meetings to bring people together, face to face, and to promote that exchange of ideas which can be only mutually profitable.

We had a total registration of 567, including 136 ladies. There was a splendid attendance from foreign countries of 123 persons, including 15 ladies, representing 21 nations. The International Union has now grown to embrace 27 countries and 2 more have applied for admittance, namely, Japan and Israel. They will be welcomed in the spirit of scientific cooperation. There were many of our own members who had not had the opportunity of going to Europe and conversing with their colleagues in other countries, so this was an excellent occasion for the ALCA members to learn of the work going on in the world in the field of leather chemistry.

A good, well-balanced program covering papers from almost every field of activity in leather was organized by our ex-president, Mr. Mieth Maeser. The topics ranged from the most advanced science of collagen to worthwhile, practical subjects dealing with matters such as the analysis of chrome tanning materials. To facilitate the understanding of the presentations, an excellent simultaneous translation service into German and French was provided by the ALCA.

The directors of several important leather research institutes were present, namely:

Dr. W. Grassmann, Max-Planck-Institut für Eiweiss und Lederforschung, Germany.

Dr. A. G. Ward, Procter Food and Leather Dept., Leeds University, England.

Dr. P. J. van Vlimmeren, Leather Research Institute T.N.O., Holland.

Dr. E. Lovendahl Jensen, Teknologisk Institut, Denmark.

Mustafa Khalil Mansolly Dabbous, National Research Center, Egypt.

L. Villa, Institut de Recherches pour les Industries du Cuir, Lyons, France.

Dr. Hans Herfeld, Westdeutschen Gerberschule, Reutlingen, Germany.

Dr. Y. Nayudamma, Central Leather Research Institute, India.

Dr. A. Simoncini, Stazione Sperimentale per l'Indust. delle Pelli e delle Materie Concianti, Italy.

Dr. E. Bischoff, Institute Prscipler Sksrasanigo, Poland.

Dr. Otto Gerngross, University of Ankara, Turkey.

Dr. Fred O'Flaherty, Director of the Tanners' Council Research Laboratory, Cincinnati, Ohio.

Dr. T. C. Thorstensen, Lowell Technological Institute, Massachusetts.

Dr. Robert Stubbings, Director of the Institute of Leather Technology, Milwaukee School of Engineering, Wisconsin.

The conference started with the Presidential Reception at 6 P.M., Sunday, August 20. On this occasion the President of the International Union and the officers of the American Leather Chemists Association were presented to the assembled guests. There was a large attendance, and the fact that so many were loath to leave gave promise of a successful meeting.

The meeting opened on Monday morning, August 21, with a fine inspirational talk by Mr. R. P. Miller of the United States State Department. Mr. Dominic Meo, Chairman of the Conference Committee, briefly welcomed the delegates and visitors and was followed by Dr. Reuben Henrich, President of the ALCA, who spoke on the history of these international meetings and traced the increasingly important role of the chemist in producing new materials for the tanner, and also in supervising leather production. Dr. Henrich stressed that there should be a closer liaison between the academic worker and the tanner. This has been a constant theme of our leaders since the War.

Then Mr. Horace Dugdale, President of the Tanners' Council, addressed the meeting. Mr. Dugdale spoke of the challenge today to the leather industry by the substitute materials made by the chemical industry. He also spoke about the difficulties that leather faces today in the international

markets, pointing out that our leather markets in the United States are completely free and open, but this has caused problems for us. He also spoke of the future of leather and the world changing technology and the concern of our own tanners about the future of leather. He concluded by saying, "There must be an international program to promote leather everywhere and not to restrict it." Finally, the President of the International Union, Professor W. Grassmann, Director of the Max Planck Institute for Protein and Leather Research, Munich, Germany, gave his Presidential Address. Dr. Grassmann spoke about the great changes that have occurred in tanning and finishing and the great range of colored leathers on the market today. He spoke in English, French and German in describing the scientific work going on in the different countries of the world.

The meeting was adjourned for lunch, and in the afternoon the whole conference made a sightseeing tour of Washington, visiting the National Art Gallery and the Capitol, where parties were able to attend briefly the afternoon sessions of the Senate and the House. Then the group next visited Arlington to see the Tomb of the Unknown Soldier and the changing of the honor guard.

On Tuesday, August 22, the scientific session got under way. The keynote address of the meeting was the John Arthur Wilson Memorial Lecture given by Mr. Marcel Riviere who was introduced by Dr. H. G. Turley. The topic of Mr. Riviere's paper, which will be published in an English translation in the Journal of the American Leather Chemists Association, was very timely, namely, "In Defense of Leather." Among the many thoughts expressed by Mr. Riviere was a plea for free exchange of knowledge of leather making, a universal request for improvement of leather quality, and a greatly needed improvement in the condition and quality of hides and skins as the raw material of the leather industry.

Taking a cue from some of Mr. Riviere's ideas, a paper by Dr. H. G. Turley was presented entitled, "American and European Leather Making." This paper discussed the different concepts of leather and the approach to making leather in Europe and America. The program settled down to a number of papers covering a wide range of interest, of which might be mentioned testing methods and apparatus, wearing quality of sole leather and physical evaluation of upper leather, a close study of the fatty materials of steerhide, and some aspects of rapid vegetable tanning processes.

On Wednesday, Mr. Maeser had organized a symposium on collagen. This was opened by Dr. Grassmann with an important paper on the structure of collagen fibrils and its importance to the theory of the tanning process. It is stimulating to see that from the classical research work on the structure of collagen fibrils there is now arriving an explanation of the ancient art of

tanning. Dr. Grassmann was followed by papers on the characterization of gelatin and properties of soluble collagen and the effect of electrolytes on soluble collagen. The question of cross-linkage of collagen was discussed in terms of the small quantities of sugars that are identified with collagen. Of interest is the acknowledgement of the differences between young and old collagen. A bacterial enzyme was described which has collagen-dissolving activity. There were also practical papers on tanning with dialdehyde starch.

On Wednesday, the delegates and officers of the International Union of Leather Chemists Societies had a business meeting. Greetings were cabled to past presidents Professor Chambard, Mr. Mallebay, Dr. Gustavson, and Dr. Bravo. The membership applications of the Japanese and Israeli Societies were approved unanimously. For the 1963 congress, invitations came from Holland and India. By vote, the delegates decided to accept the invitation from Holland. New officers were elected as follows: President: Dr. P. J. van Vlimmeren; 1st Vice-President: Dr. E. Baumann; 2nd Vice-President: Professor W. Grassmann; Elected Members: Mr. A. Rey, France, and Mr. E. L. Jensen, Denmark; Secretary: Mr. George Forsyth; Treasurer: Professor D. Burton; Asst.-Treasurer: Professor A. G. Ward.

On the question of the joint committee with the International Council of Tanners, it was decided to keep this active for another year. Dr. Grassmann's Presidential Address contains the substance of the Union's thought on the question of cooperation at the scientific level with the International Council of Tanners.

On Thursday, the one-half day morning session was given over to practical tanning, to cover modern methods of chrome tanning, the reducing powers of various materials against chrome, a fine paper on the basicity of chrome tanning compounds and solutions, the reaction of chrome salts with synthetic polypeptides, combination tannage of glutaraldehyde and chrome, and a study of the urea-formaldehyde tannages.

In the afternoon, the whole conference enjoyed a boat ride down the Potomac River to Mount Vernon. It was a beautiful day and the view across the river and hills from George Washington's home was most rewarding. The return trip to Washington in the cool of the evening was completely enjoyable.

Friday, the last day of the conference, the whole day was devoted to a session of practical papers covering vegetable tanning in buffered solution, new pickling acids, developments in brine-curing hides, tanning with polyphenols, vegetable retanning of chrome-tanned leathers, preservation of calfskins, and investigation of salt stains. The last paper on the program was a delightful paper on the Indian bag tannage, by Mr. Sanjoy Sen of Calcutta.

The final ceremony of the conference was the banquet held Friday evening. This is always a closing feature of the international meetings and proved to be an enjoyable affair. Through the kindness of the Canadian members and of the Leather Industries of America, lovely favors of leather were presented to the ladies attending the conference, and the American Leather Chemists Association presented them with leather purses. Dr. Henrich, President of the ALCA, thanked the delegates and visitors from foreign countries and all who had helped in the program. On behalf of the Awards Committee of Mr. Charles Morrison, Dr. J. Kanagy, and Dr. H. G. Turley, chairman, Mr. Theodore Brother was presented with the Winheim Award, and Dr. W. Windus with the Alsop Award. The awards were presented by President Henrich. Mr. J. Marcus Harrison, substituting for Mr. George Forsyth, as Secretary of the International Union, proposed a witty toast to the ladies. Tokens of appreciation were presented to Mrs. Jean Henrich for her efforts in organizing the ladies' program; to Mr. Meo for his great contribution to a successful meeting as Conference Chairman; and on behalf of the International Union, to Dr. Henrich, Mr. Meo, and Professor Grassmann. Mr. Meo called on several representatives from the foreign associations to make an address and replied, when suitable, in French, German, and Italian. Meo positively scintillated. Dr. Grassmann, as President of the International Union, gave the concluding farewell speech, thanking the host society, the ALCA, for their fine program. It was announced that Dr. H. G. Turley had been invited to present the next John Arthur Wilson Memorial Lecture in 1962 at Mackinac.

It is planned that the next international meeting will be sponsored by the Dutch Tanning Chemists Society and will be held in 1963 in Scheveningen, Holland. Dr. van Vlimmeren, the International Union President-Elect, welcomed the delegates and all visitors to attend the Holland meeting.

So ended a memorable and outstanding meeting of the International Union of Leather Chemists Societies in the U.S.A.

Before leaving for home, many foreign visitors participated in two tours of tanneries and leather research institutes in Wilmington, Philadelphia, Boston, Cincinnati, Chicago, Milwaukee, and St. Louis.

H. G. TURLEY

REPORT OF CHAIRMAN OF THE LADIES' COMMITTEE

136 ladies were registered, and adding to this several relatives, about 145 persons participated in the ladies' activities. At registration, every lady was given a leather purse as a welcoming gift from the American Leather Chemists

Association. In addition to the activities of the whole conference, the ladies enjoyed the following special activities.

Monday morning: An informal "coffee" gave all an opportunity to meet old friends and to make new ones.

Tuesday: An all-day tour was arranged for visiting the White House and walking through the public rooms and seeing the East, Red, Green, and Blue Rooms and the lobby entrance and grounds. The next visit was to the Hall of First Ladies at the Smithsonian Institute to see period models and gowns worn at the inaugurations of all the United States Presidents since George Washington. The group then visited the Custis-Lee Mansion and grounds and Arlington Cemetery. Lunch was served at Alexandria, Virginia, in the delightful 18th century atmosphere of the Olde Club—a club attended by George Washington. The final visit was made to the beautiful Islamic Mosque on Embassy Row.

Wednesday: One group of ladies visited the Smithsonian Institute while another group went to the new shopping center at Chevy Chase. On Wednesday afternoon the Leather Industries of America presented an informal leather fashion show. Three convention ladies "pinch-hitted" very successfully as models, displaying ladies' dresses, jackets, suits, and coats. To some of the lucky ladies went 18 door prizes of leather handbags, travel cases, accessory sets, and other items. After the show, each lady selected a beautiful leather flower corsage donated by the Leather Industries of America.

Friday: Several groups visited the Washington Cathedral, the Shrine of the Immaculate Conception, the Franciscan Monastery, the Wax Museum, the Botanical Gardens, and government buildings. At the closing banquet on Friday night, all the ladies were given, through the courtesy of the Canadian tanners, lovely leather maple leaf pins and sets of coasters. It was generally agreed that the ladies had a most enjoyable experience.

JEAN HENRICH
Chairman, Ladies Committee
I.U.L.C.S. Washington Conference

ABSTRACT

Quality of Split Glue Stock for the Manufacture of Artificial Casings. L. Ulrychová and J. Pokorný. *Kožařství*, **11**, 134–35 (1961).—Untanned splits used for making artificial casings must be low in fat. Thorough fleshing before splitting is essential. Satisfactory splits contain 2.14% fat (1.42% extractable directly by petroleum ether and 0.72% after HCl hydrolysis), while splits from poorly fleshed hides may contain over 6% fat. This fat cannot be removed in the casing factory. L.M.

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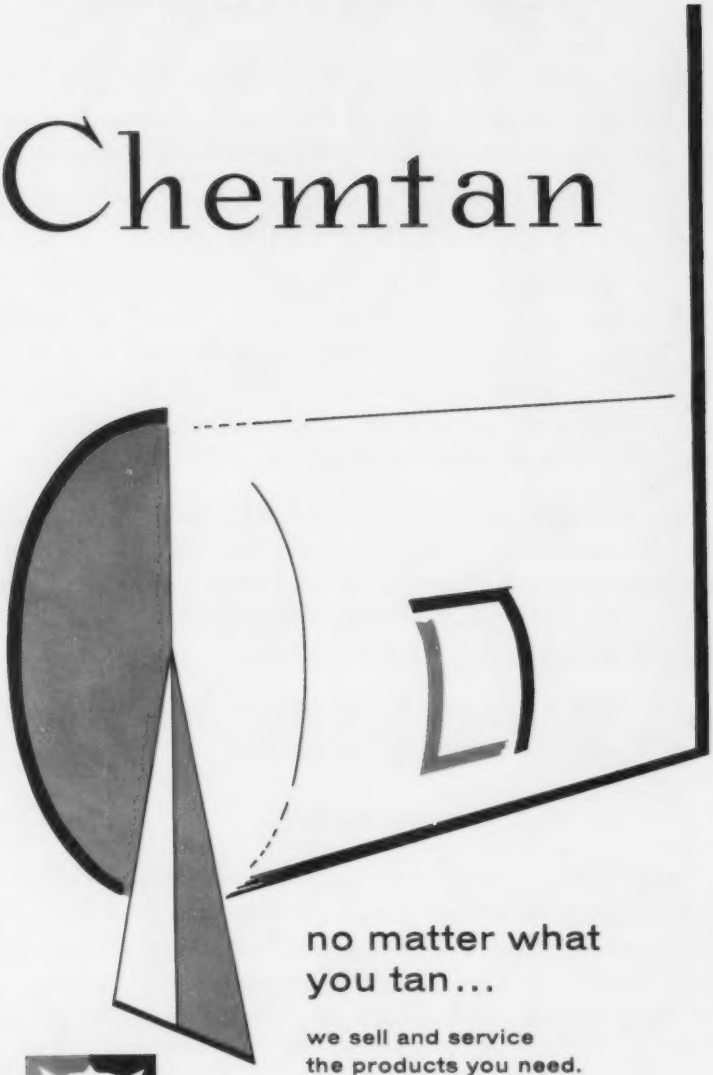

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